Annual Report

A Descriptive Review of Data from the

Fleet and Marine Corps Health Risk Assessment

An analysis of one year's data from the Fleet and Marine Corps HRA was undertaken to determine which demographic groups were utilizing this HRA and to quantify risk behaviors by demographic groups.

Data were collected for all HRAs completed between July 1, 2006 and June 30, 2007. Only those assessments completed by USN, USNR, USMC, or USMCR members were included in the analysis. Incomplete records were not included, leaving a total of 111,437 records in the analysis.

Overall, the highest reported health risks included low intake of fruits and vegetables (86%), work stress (54%), lack of dental flossing (49%), and not getting enough restful sleep (34%). Other significant areas of concern included smoking (27%), heavy drinking (28%), lack of personal support (28%), and lack of aerobic activity (27%). Calculating mean number of risk factors showed that more USMCR members qualified as "high risk" (51.5%), followed by the USMC (46.7%), USN (35.7%), and USNR (22%). Younger males were generally at significantly higher risk.

In conclusion, even though the Fleet and Marine Corps HRA is a self-reported assessment, members commonly report risk behaviors that can be detrimental to personal well-being and military readiness.

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Introduction

Health Risk Assessments (HRAs) became widely used both in military and civilian settings beginning in the mid-1980s. Health Risk Assessments (HRA) are tools that can inform and motivate participants, assist healthcare professionals in the planning of interventions, and inform decision makers of the overall health status of their members. Different versions of HRAs can be used to assess a range of conditions and risk behaviors among specific subgroups in the population.

Background

The Fleet and Marine Corps HRA is a 21-question self-reported, Web-based health assessment tool. Surface Forces, Pacific (SURFPAC) originally requested that the Navy and Marine Corps Public Health Center (NMCPHC) design a brief Web-based tool to help them identify the most prevalent behaviors associated with unhealthy outcomes so that they could then plan appropriate health promotion programs. Primary uses of the HRA now appear to be in support of the Periodic Health Assessment as well as in both worksite and general community health promotion programs.

Methodology

The number of record entries has continued to increase each year since the development of the Fleet and Marine Corps HRA. Data were collected for a recent 12-month period, from July 1, 2006 through June 30, 2007. The data were then analyzed by the Epidemiologic Data Center at the Navy and Marine Corps Public Health Center (NMCPHC) in order to provide stakeholders with a cross sectional analysis of the results. There were 113,139 records within the time frame requested. Records with an indication of Service other than United States Navy (USN), United States Navy Reserve (USNR), United States Marine Corps (USMC) and United States Marine Corps Reserve (USMCR) were removed from the dataset, with 111,719 records remaining. In addition, a record was considered incomplete if any field was left blank. Removing incomplete surveys resulted in a total of 111,437 records remaining for analysis.

Results and Discussion

Reliability, Validity, and Representativeness

Reliability: A set of test questions that are reliable will result in consistent responses by a subject from one occasion to the next. The more unambiguous a question, the less chance there is for reliability to be a problem. The questions on the Fleet and Marine Corps HRA are quite direct, and were phrased to minimize interpretation of their meaning by the individuals.

It is important to note the population being assessed with this tool. The primary target group of the Fleet HRA is young (18-38 years of age), healthy, active duty Sailors and Marines who possess a certain level of literacy rather than youths and seniors, persons with chronic medical conditions, persons with other significant life issues that might

affect the way they answer this set of questions, or persons who require more assistance in completing the assessment.

The scope of a tool must also be considered when assessing reliability. This tool provides a brief, general assessment of major behavioral risks and then provides awareness and encouragement to individuals to modify those risks. Constraints initially placed on the development of this assessment included limiting the length of the tool to approximately 20 questions that could be completed quickly, i.e., within a few minutes. It is not intended to identify preexisting pathology. Nor does it propose to assess an absolute measure of risk for occurrence of disease or injury or quantify a risk of death based on the reported lifestyle behaviors.

Validity: Validity indicates the degree to which a tool or test measures what it is trying to measure. It is essential to clarify the purpose of the tool when trying to demonstrate validity. The HRA seeks to identify healthy lifestyle choices and various levels of risk that jeopardize health, either from disease or injury. Selecting the majority of the content areas for the question set was based on authoritative sources such as research about HRAs, national objectives from Healthy People 2010, and some military specific issues. It is assumed that in most cases, the amount, degree, frequency of risk exposure will generally result in more frequent and severe negative health outcomes. The response options on the Fleet HRA reflect these varying levels of risk exposure.

Specific questions came from other validated tools such as the Alcohol Use Disorders Identification Test (AUDIT), the DoD Survey of Health Related Behaviors Among Military Personnel, and the National Health and Nutrition Examination Survey (NHANES). Although validity generally refers to the entire tool, as opposed to each individual question, taking a question from an established questionnaire that has been tested can serve to increase construct validity if the intention of the questionnaire being designed is similar in nature to the questionnaire that has already been tested.

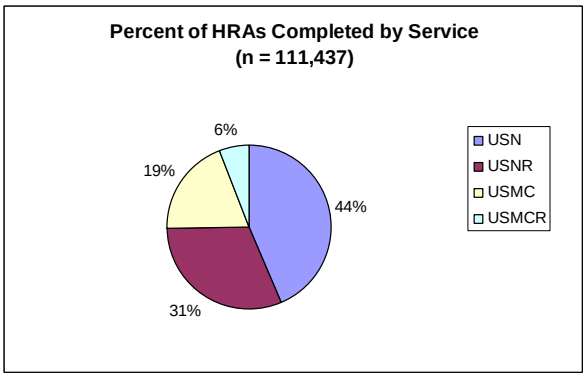
Representativeness: Results of an activity that involves only a portion of the entire population may not reflect the true picture of risk unless the individuals who participated can be shown to be similar to those who did not participate. The primary method for ensuring representativeness is to randomly select participants. In this case, two facts support the Representativeness of the data. First, significant numbers from each Service component participated, and the number of participants has been steadily growing. Second, although adoption of the tool was voluntary for local commands, there is no reason to suggest that the "early adopters" differ from those who have not yet used the tool. However, a possible limitation of the tool is that it does not differentiate between those members whose risk factors have been affected by military deployments.

Data on HRA Completion

A significant number of active and reserve members completed the HRA during this period.

Figure 1: Percent of HRAs completed by Service

- USN = 48,457
- USNR = 34,875
- USMC = 21,496
- USMCR = 6,609



Results of any data analysis should address the demographic characteristics of the participants. Since age is an important factor in influencing behavioral choices, it is important to know what age groups completed the assessment. The mean ages of service members who completed the assessment varied significantly by their Service component: USN=30.2 years of age; USNR=37.7 years of age; USMC=25.1 years of age; and USMCR=25.5 years of age. As expected, Navy members who completed the HRA tended to be older than Marines, and reservists tended to be older than their active duty counterparts. Since age may influence risk behaviors to some extent, the risk profile between members of different components would be expected to differ somewhat.

Figure 2: Overall completion of HRAs by age

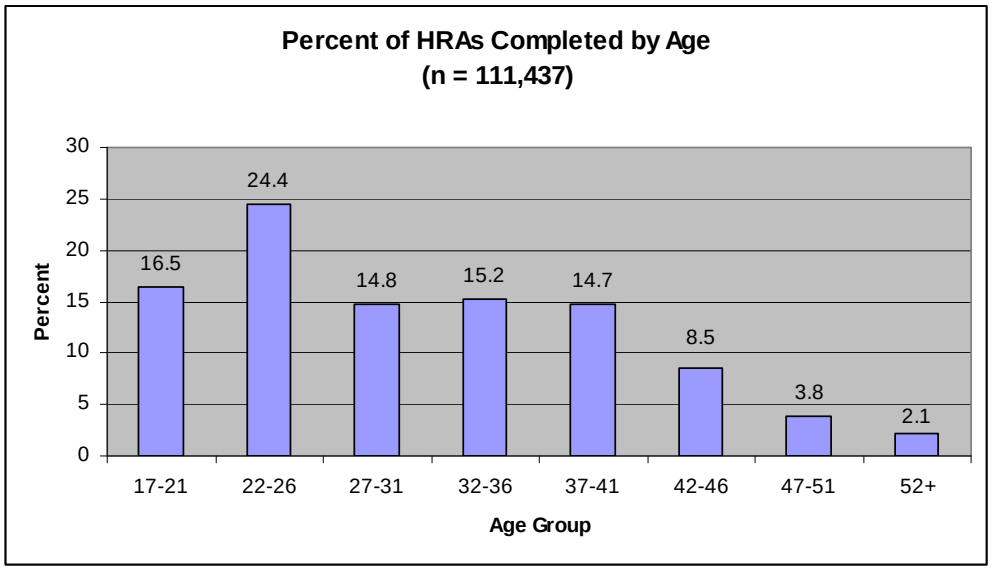
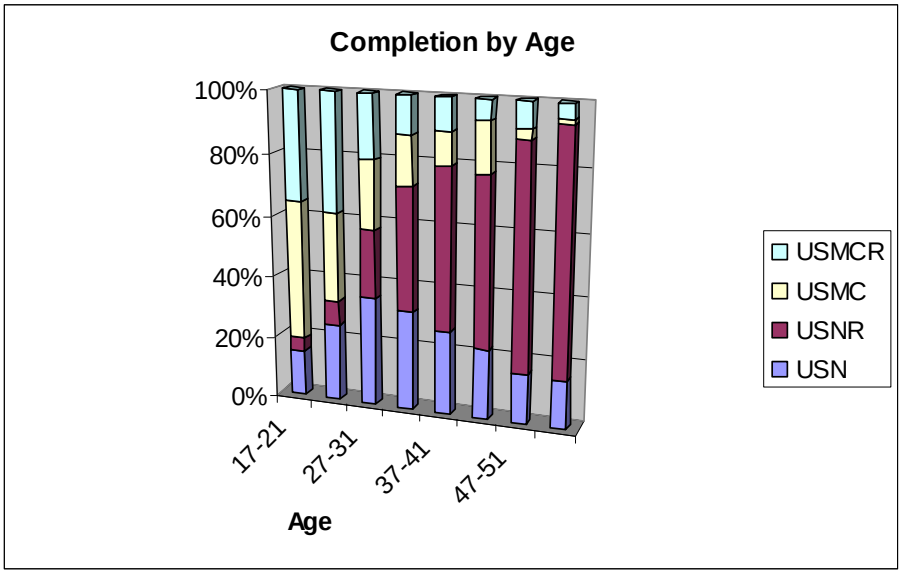
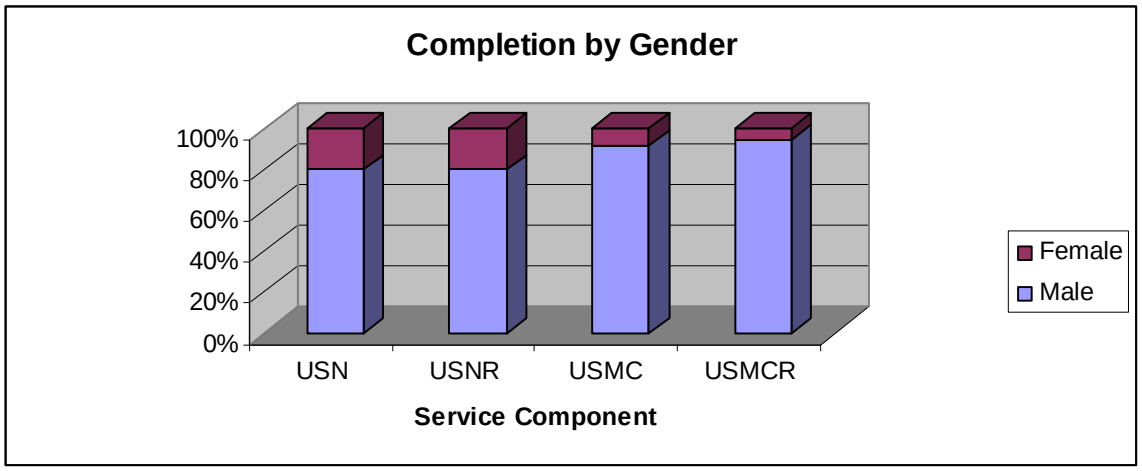


Figure 3: Percent of HRAs completed by age and Service component



Significantly more males compared with females completed the HRA, which reflects the greater number of male service members. This difference was especially strong in the Marine Corps. Therefore, since gender may influence some risk behaviors, results on the HRA for Marine Corps members would be expected to differ somewhat from Navy members.

Figure 4: Completion by gender



Completion of the HRA was also tracked by rank, which can indicate how widely the tool is utilized. It is important to recognize that, as with various age groups, completion of an HRA is applicable for all ranks. Health risks may vary between ranks, but it can be expected that the health of members of each rank may be impacted by their lifestyle choices. Health education should then be tailored to the individual's health issues. Out of the total number of HRAs completed, 83% were completed by enlisted members, 16% by officers, and less than 1% by warrant officers.

Figure 5: Completion by enlisted rank

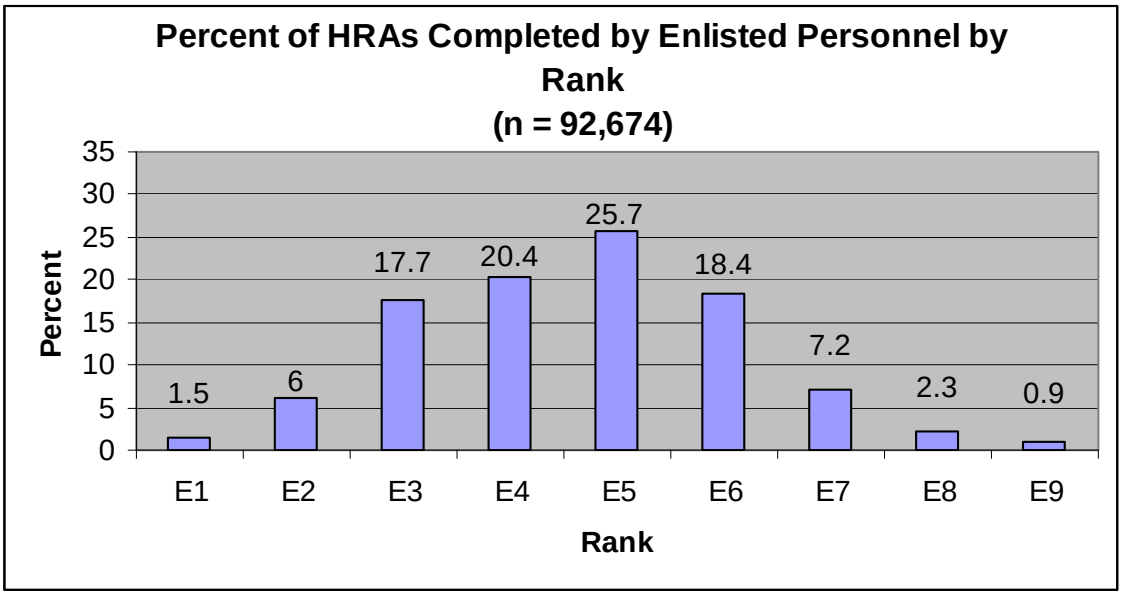


Figure 6: Completion by officer rank

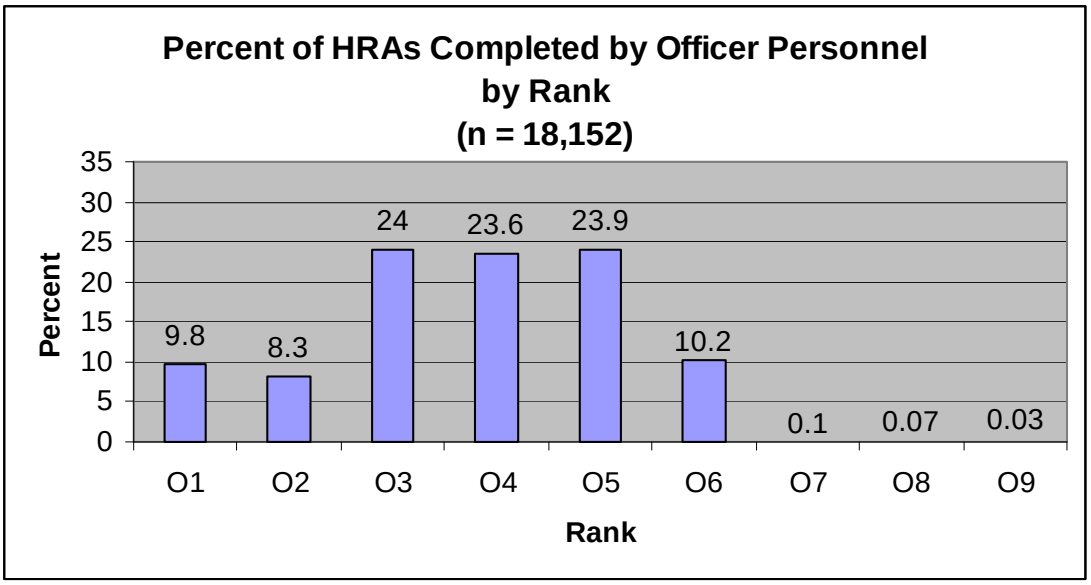
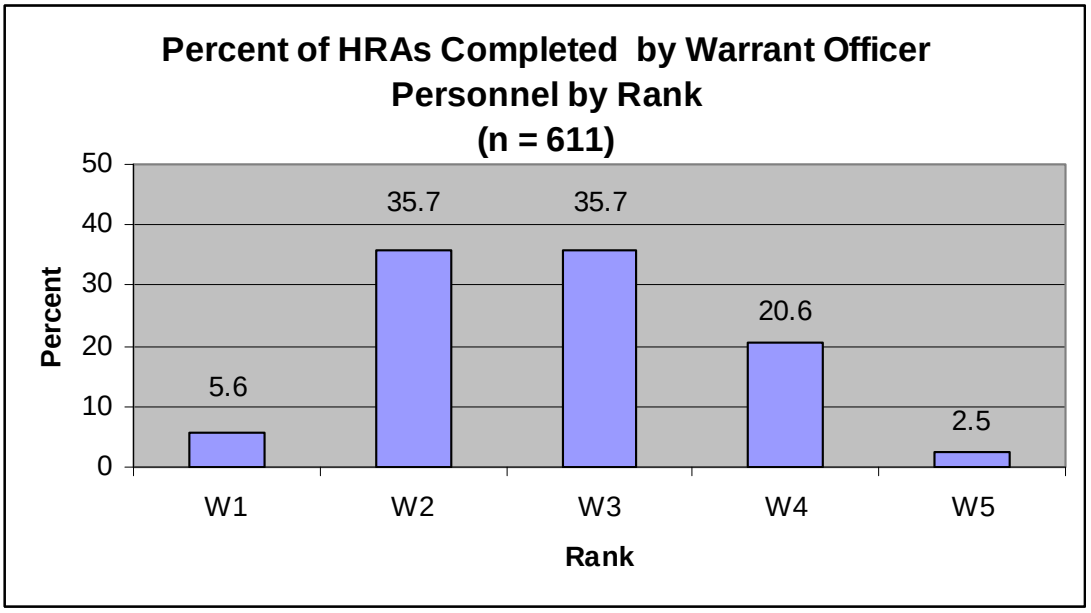
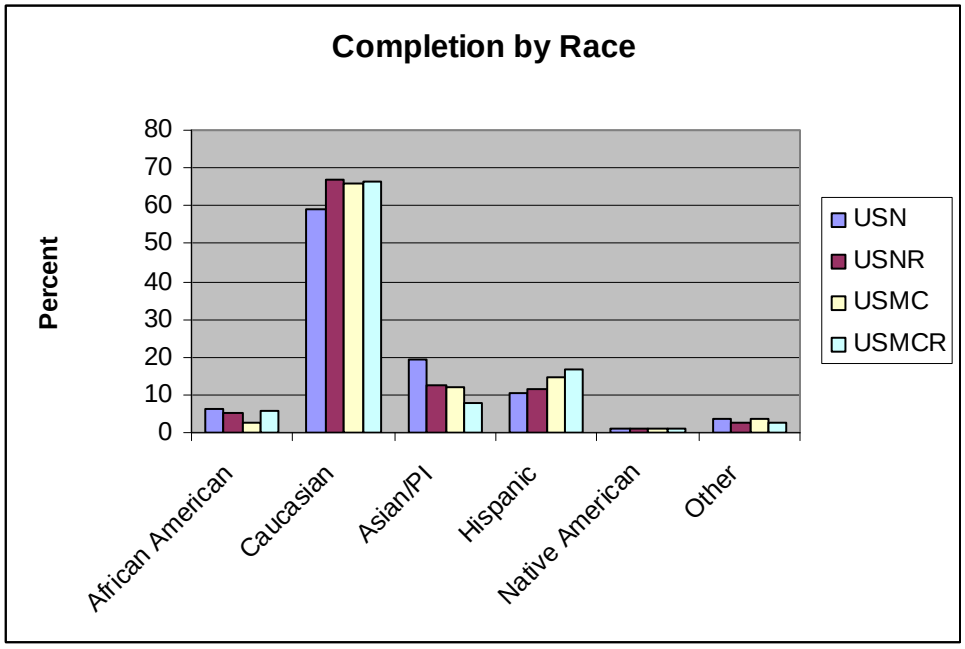


Figure 7: Completion by warrant officers



Race varied somewhat between Service components. It appeared that the active duty Navy had fewer respondents who were Caucasian and more who were Asian or Pacific Islanders. However, because the differences in race between Service components did not appear to be significant and other demographic variables such as age and rank are probably more important determinants of risk behavior, the effect of race on the results was not examined further.

Figure 8: Completion by race

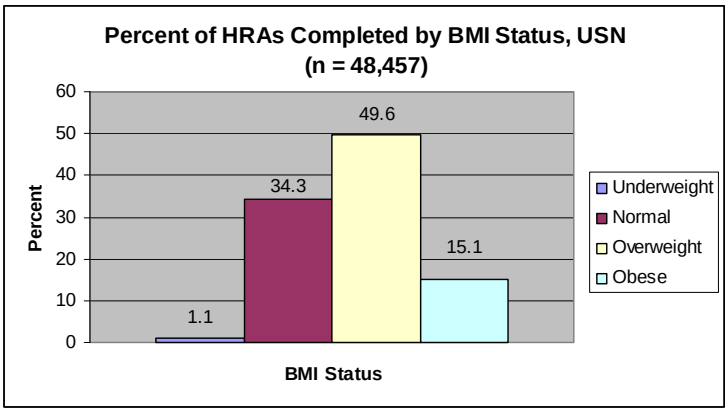


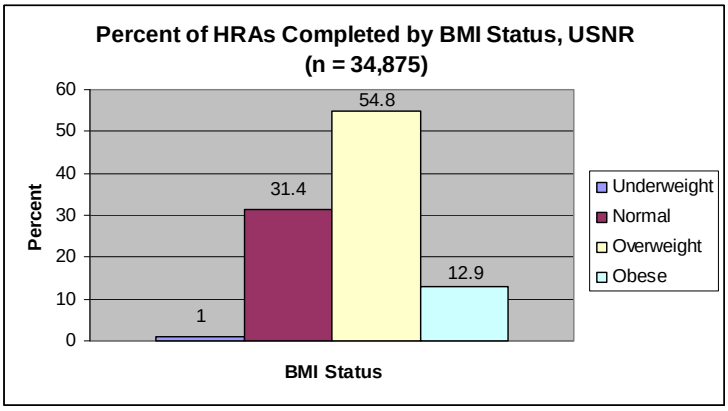
Body Mass Index (BMI) was calculated and reported to each individual based on self-reported height and weight. For most people BMI correlates well with their amount of body fat, although some people, such as athletes, may have a BMI that identifies them as overweight even though they do not have excess body fat. Therefore, these data should not be construed to mean that all individuals exceeding these levels are either overweight or obese. Nevertheless, BMI is a commonly used metric, which has been found to correlate well with health status. Values that exceed healthy levels have been shown in research studies to increase the likelihood of certain diseases and other health problems. An adult who has a BMI between 25 and 29.9 is considered overweight. An adult who has a BMI of 30 or higher is considered obese.

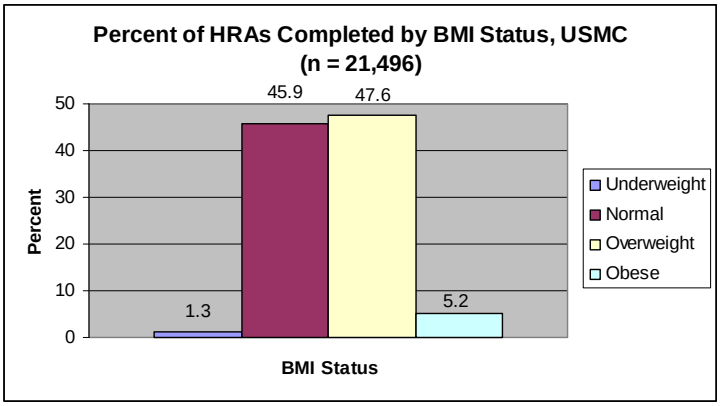
The Navy and Marine Corps screening tables for height and weight equate to the BMI index, but each Service component chose to establish their own upper permissible limits, generally somewhat higher than 25. For the Navy these limits range from 26.6 to 27.8 for males and 23.6 to 28 for females, depending on their height. For the Marine Corps the upper limits are virtually the same for all males at 27.5 and for all females at 25.

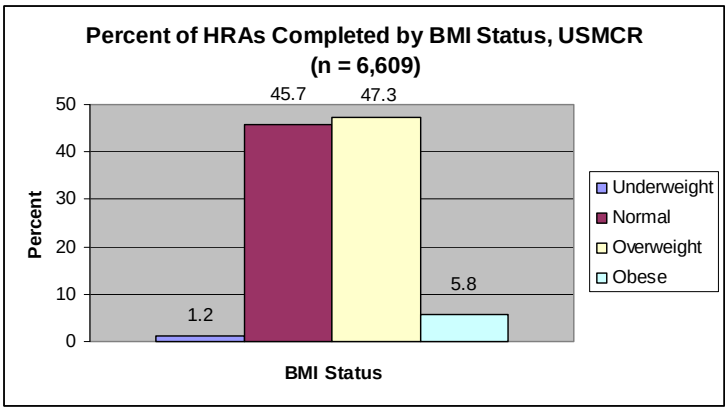
The data indicated that in general Navy personnel were more likely than Marines to be classified as either overweight or obese. Likewise, a significantly greater proportion of Marines were considered to be of normal weight.

Figure 9: Completion by BMI






Percent of HRAs Completed by BMI Status, USMC
(n = 21,496)
45.9
47.6
50
40
30
20
10
0
Percent
1.3
5.2
Underweight
Normal
Overweight
Obese
BMI Status


Percent of HRAs Completed by BMI Status, USMCR
(n = 6,609)
45.7
47.3
50
40
30
20
10
0
Percent
1.2
5.8
Underweight
Normal
Overweight
Obese
BMI Status

Question Set and Scoring

The Fleet and Marine Corps HRA is composed of a general self-assessment of personal health, followed by 20 questions within 10 topic areas. Members are rated as "healthy" according to the following standards if they report:

1. smoking: does not smoke
2. smokeless tobacco: does not dip
3. drinks per day: not more than 2 drinks/day
4. heavy drinking: not more than 2 occasions per year when consuming 5 or more drinks
5. drinking and driving: never driving after having too much to drink
6. seat belt use: always use seat belts
7. helmet use: most or all of the time
8. safety equipment: most or all of the time
9. life satisfaction: being mostly or very satisfied with life
10. work stress: rarely or never experiencing too much work stress
11. having personal support: always or most of the time
12. condom use: always use condoms unless in a monogamous relationship or abstinent
13. aerobic physical activity: 3 or more days/week
14. strength training: 2 or more days/week
15. high-fat foods: not more than 3-5 times/week
16. fruits & vegetables: consume at least 7 (male) or 5 (female) servings /day
17. supplement use: seldom or never use to manage weight, enhance athletic performance, or treat depression
18. dental brushing: at least once/day
19. flossing: on most or all days
20. sleep: gets restful sleep most or all of the time

Discussion of the Question Set:

For some of the behaviors there is not a "healthy" level, such as for tobacco use, unprotected sex outside a mutually monogamous relationship, or drinking and driving. Using tobacco products is always unhealthy, and the degree of risk increases with the amount. There are many reasons why unprotected sex might result in unhealthy outcomes, but consistent and correct condom use is highly effective as a preventive measure in most cases. Consuming alcoholic beverages will unquestionably impair the ability to operate motor vehicles, and is another dose-response relationship, where increasing consumption increases the degree of impairment.

The three mental health questions do not identify mental illness; rather, they address key determinants for maintaining positive mental health. While stressful situations are inevitable and can even provide for healthy challenges and fulfillment in life, too much stress will be counter productive. Therefore, responses were scored as "healthy" if members usually experienced a positive outlook on life and had a supportive environment.

Scoring of items for “healthy” physical activity and nutrition were also set at minimum levels to maintain health rather than at optimal levels. Ideally, members who begin a physical activity program will continue to increase their amount and intensity of physical activity over time.

Although supplement use per se is not “unhealthy”, the HRA addressed three primary areas of potential abuse among frequent users. Potential adverse effects and the failure to address underlying problems continue to make supplement use a topic of concern in the military.

Although most people indicated they brush their teeth, flossing is also necessary in order to preserve teeth into middle and late-adult years.

Finally, one question about restful sleep was included. There can be many causes, both biological and environmental, that lead to sleep deficiencies. However, the toll on quality of life, productivity, and safety due to difficulty in getting restful sleep are immense.

Individual Responses by Service Component

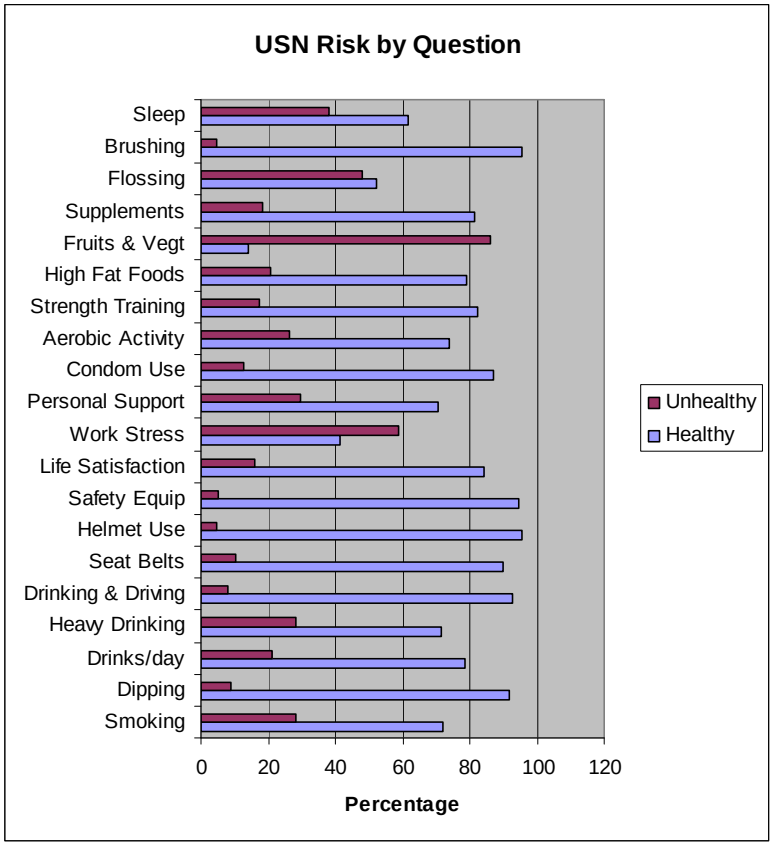
Overall, 94% of all members rated their “health in general” to be either good or excellent. A current perception of good health may in fact be a disincentive to make lifestyle changes if the perceived consequences of unhealthy behaviors are minimal.

It is difficult to directly compare Service components because the demographic characteristics that influence health behavior, as described earlier, vary significantly. Multivariate analysis was not conducted to analyze differences between Service components. However, it is a reasonable assumption that both age and military cultural norms strongly contribute to health issues.

The USN and USNR matched on their leading three health risks. More than 40% of members in both groups reported unhealthy levels of fruit and vegetable intake, work stress, and dental flossing. They also matched on other health risks. Between 20% and 40% of both groups reported problems with getting enough restful sleep, getting minimal aerobic physical activity, and lacking personal support to deal with stress. Interestingly, USN members reported higher levels of heavy drinking (28%), an unhealthy level of alcohol consumption per day (21%), and higher rates of smoking (28%) than did the USNR.

Likewise, the USMC and USMCR matched closely on their reported risks. More than 40% of members in both groups reported unhealthy levels of fruit and vegetable intake, work stress, dental flossing, as well as heavy drinking. In addition, the active component reported slightly more problem with getting enough restful sleep (41% versus 38%) and a significantly higher rate of smoking (42% versus 33%). Between 20% and 40% of both groups reported problems with frequently eating high-fat foods, lacking personal support to deal with stress, an unhealthy level of alcohol consumption per day, and frequent use of smokeless tobacco.

Figure 10: USN and USNR risk by question



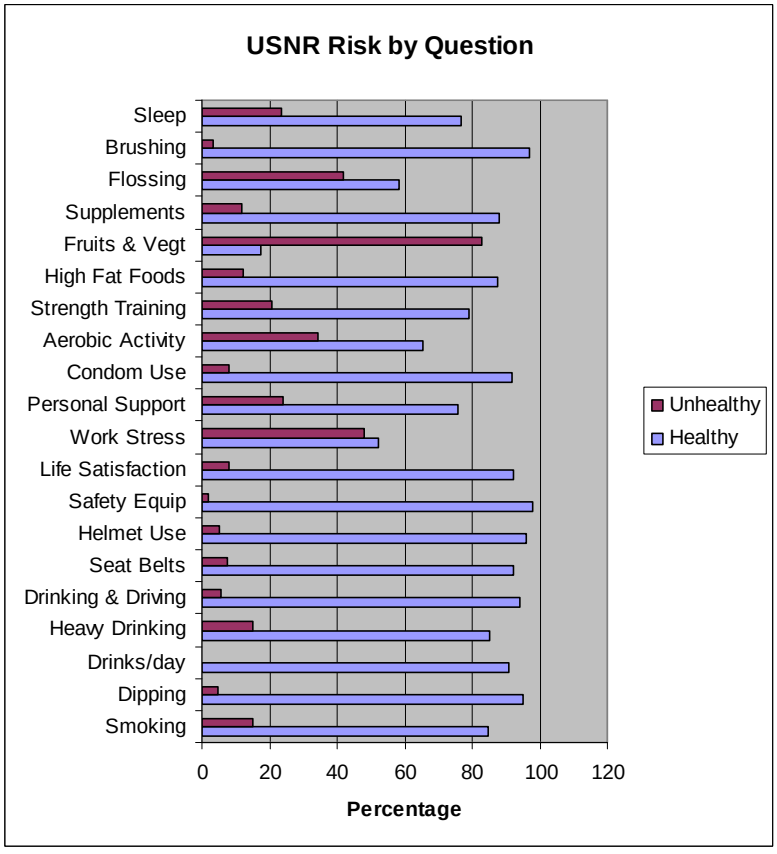
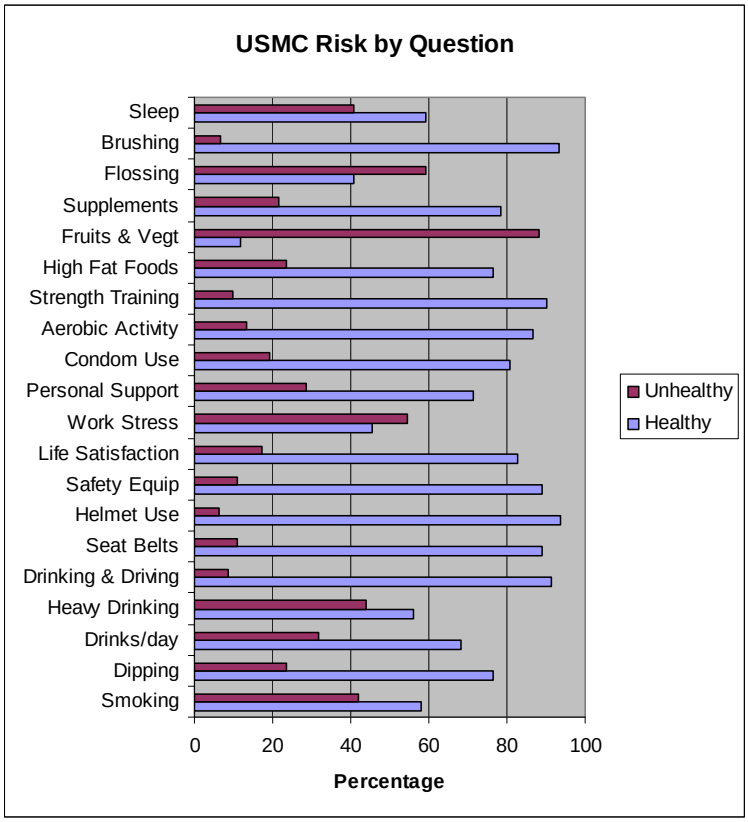
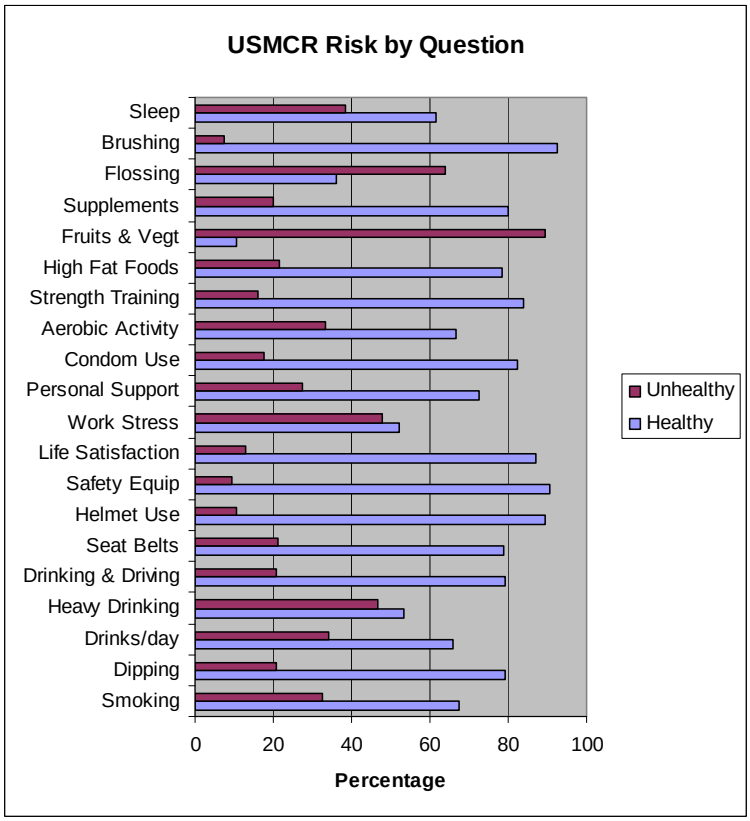


Figure 11: USMC and USMCR risk by question





Mean Risk Categories by Service Component

The questions were also grouped into 10 categories, which provide a snapshot similar to the "Leading Health Indicators" from the Department of Health and Human Services. Admittedly, each of these group categories may present varying degrees of risk for any individual, e.g., there can be a wide range of consequences for individuals who use tobacco products. However, each category represents an independent risk issue that can be addressed through counseling and health education programs. The categories are:

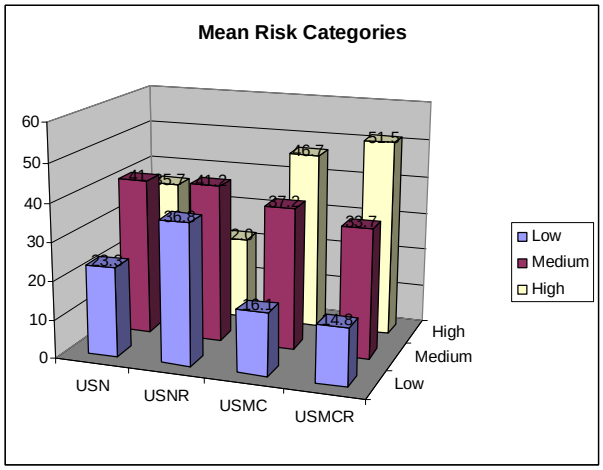
1. tobacco use
2. alcohol use
3. safety
4. stress management
5. sexual health
6. physical activity
7. nutrition
8. supplement use
9. dental health
10. sleep problems

The individual's risk category is scored as low, medium, and high according to the number of identified risks. If an individual indicates one or more risks within any category, e.g., indicates either smoking or using smokeless tobacco, then he/she will be scored as "at risk" for that category. Therefore, it is possible for an individual taking the HRA to report from 0-10 risk categories.

The USNR had significantly more members who scored in the low-risk category. Members in the USMC and USMCR had higher mean risk category scores. Past research has demonstrated that having more risks is associated with greater future utilization of healthcare resources. Each individual is given an overall score based on the following:

0-2 risk categories=low risk
3-4 risk categories=medium risk
5 or more risk categories=high risk

Figure 12: Mean risk categories by Service



Mean risk categories varied by demographic variables. Statistical analysis (t-test) indicated that there is a statistically significant difference between males and females ($t = 51.39$, p-value $< .0001$), with males having a higher mean risk number (3.94) than females (3.19).

Age was a second strong predictor of mean risk categories. There was a statistically significant difference between virtually all age ranges and a very clear trend of decreasing mean risk score with age. This may be due to those at higher risk not remaining in the service and to individuals choosing to make healthier choices as they age. The youngest age group (17-21 years of age) had a mean of 4.41 risks compared to the oldest age group (52+ years of age) having 2.71 risks. Similarly, a greater proportion of younger service members were in the high-risk category. The same association with age was demonstrated by comparing rank with mean risk numbers. For example, E1-E3 also had a mean risk number of 4.41. Overall, enlisted members had a higher mean risk number than officers, 3.99 compared to 2.94, respectively. (Note: Warrant Officers and Flag Officers were not compared to other ranks due to small sample sizes.) To repeat, components with larger percentages of young males would therefore be expected to have higher risk levels.

Table 1: Mean risk by age

	Mean Risk Number	95% Confidence Interval	% in high risk Category
17-21 (n = 18,389)	4.41	4.39, 4.44	47
22-26 (n = 27,144)	4.33	4.31, 4.36	45
27-31 (n = 16,527)	3.83	3.80, 3.86	35
32-36 (n=16,897)	3.58	3.55, 3.61	29
37-41 (n = 16,320)	3.34	3.31, 3.67	24
42-46 (n = 9,519)	3.08	3.05, 3.11	19
47-51 (n = 4,278)	2.85	2.80, 2.90	14
52+ (n = 2,363)	2.71	2.65, 2.78	12

Finally, race was examined as a predictor of mean risk number. American Indians and Native Alaskans had the highest mean risk numbers, but they were not compared to other race groups due to the small number of members in these groups. There was a small but statistically significant difference between Caucasians (mean risk number=3.85) and other groups that had mean risk numbers ranging from 3.71 to 3.75. Apparently, in this military population there is relatively little difference between races.

Table 2: Mean risk by race

	Mean Risk Number	95% Confidence Interval	% in high risk Category
African American (n = 5,892)	3.71	3.66, 3.75	31
Caucasian (n = 70,510)	3.85	3.84, 3.87	35
Asian/Pacific Islanders (n = 16,826)	3.75	3.72, 3.79	22
Hispanic (n = 13,428)	3.75	3.72, 3.79	34

Conclusions

A large number of service members have completed the Fleet and Marine Corps HRA. The results have provided a large amount of data that can be used to characterize the lifestyle choices of the various groups of military members. These data show that many members report that their lifestyles include many risk factors that are associated with the most prevalent and serious health problems in the U.S. today. The aggregate results of one year's HRA data provides Navy leadership with valuable near real-time information on health risks that can adversely affect service members' performance, quality of life, and future military healthcare costs.

Recommendations

The Fleet and Marine Corps HRA identifies risk factors that can be prevented or reduced through lifestyle modification. Upon completion of the HRA, every individual has the opportunity to print a Member's Personalized Report that provides brief feedback and websites for further high quality health education and guidance. The Commanding Officer Report identifies the most important health concerns within commands. Health educators and medical providers should use these reports to tailor education to individual service members and also provide interventions that address common health risks for the overall command.